

Current Indoor airPLUS Policy Record

Last Revised: November 18, 2013

Purpose

EPA regularly receives partner questions and comments regarding various aspects of the Indoor airPLUS program requirements. This Policy Record format will be used to provide regular updates on the resolution of future issues, including changes to program requirements and clarifications or refinements to the specifications. The primary purpose of this document will be to allow stakeholders equal access to the latest policy issues and resolutions. This document will also act as an official program update.

How to Use this Document

Included in the chart below are questions and issues that have arisen since the release of Revision 1 of the Indoor airPLUS Construction Specifications.

Please submit any comments on the Policy Record via email to Indoor_airPLUS@epa.gov.

Issue Classifications

Each issue listed here is classified as a Change, a Clarification, a Refinement, a Comment or an Issue Under Review. These are defined as follows:

Change – The addition, deletion or modification of a program requirement. A change will typically result from a partner question or feedback indicating that EPA's original intent is not being met or from changes in relevant standards. A change is the most significant type of edit for partners because it is likely to change the way that partners comply with the program.

Clarification – The clarification of a program requirement, typically resulting from a partner question indicating confusion or ambiguity. Clarifications are not intended to significantly change the scope of the program guidelines, but rather to clarify the original intent of the requirement. A clarification is secondary in importance to a change; it should not significantly alter the way that most partners comply with the program.

Refinement – A minor revision, such as an improved choice of words, a grammatical correction or a correction to a typographical error. A refinement is the least important type of edit; it should have no impact on the way that partners comply with the program.

Comment – A comment provided by EPA in response to a question, which results in no change to the program documents. This may occur, for example, if the question can be answered by referring to already established policy. Aside from the partner asking the question, such comments will typically have no impact on the way that partners comply with the program.

Issue Under Review – An issue that has been submitted and that EPA is still evaluating. Once EPA has evaluated the issue, it will offer a resolution and re-classify the issue using one of the four categories above.

Current Indoor airPLUS Policy Record

Last Revised: November 18, 2013

| ID | Log Date | Classification | Topic |
|------|------------|----------------|---|
| 0001 | 07/25/2013 | Change | <p>Section 5.4 - Garage exhaust fan</p> <p>Issue: Since the inception of the Indoor airPLUS Program, EPA has received extensive feedback from prospective and active Indoor airPLUS partners questioning the technical rationale for requiring installation of exhaust fans in attached garages, per Section 5.4 and expressing concern about the cost associated with the requirement in the absence of data demonstrating the benefits to homebuyers. Partner observations fall into two categories: 1) The ENERGY STAR and Indoor airPLUS air sealing requirements provide adequate protection against the infiltration of garage pollutants into the home; and 2) an exhaust fan in the garage is not needed because the typical attached garage is outside of the conditioned space, not routinely used as living space, and there is already substantial air leakage between the garage and the outdoors.</p> <p>Resolution: Indoor airPLUS previously required mechanical exhaust ventilation in attached garages as part of an integrated five-part strategy intended to limit occupant exposure to garage pollutants, including automobile exhaust and off-gassing of chemicals from products commonly stored in garages. Both leakage into adjacent living spaces as well as exposure during occupant use of the garage for extended periods for hobbies, work, or recreation, drove this requirement.</p> <p>First, the Indoor airPLUS Construction Specifications, Section 4.3, prohibit HVAC equipment from being located in garage spaces in order to avoid potential entrainment of garage contaminants into the HVAC system. The requirements also prohibit ducts and HVAC equipment from being located in framing spaces or cavities adjacent to garage walls or ceilings unless separated by a complete air barrier, such as drywall.</p> <p>Second, the ENERGY STAR Certified Homes program includes extensive requirements for air sealing of the garage-to-house interface, including walls, floors of rooms above the garage, and all wall penetrations (e.g., plumbing and electrical). These requirements provide an important level of protection to reduce the likelihood that potentially harmful pollutants from the garage might enter the living space.</p> <p>Third, access doors between the house and garage must be weather-stripped or gasketed and are required to have an automatic door closer, also referred to as a spring loaded hinge.</p> <p>Fourth, mechanical exhaust ventilation (i.e., a garage fan) is required to supplement these strategies and to reduce contaminant levels in the garage during periods of garage occupancy. The current requirement allows either a 70 cfm through-the-wall or ducted fan wired for continuous operation (recommended option) or, alternatively, wired to a motion sensor or other control that will ensure that the fan runs during, and for at least 10 minutes after, occupancy.</p> <p>Finally, carbon monoxide alarms are required as a backup to the above strategies in all Indoor airPLUS homes with attached garages or combustion equipment.</p> <p>In reviewing the state of the science concerning garage contaminants and infiltration into the home, it is evident that preventing garage contaminants from entering the living area is an important health protection; yet only limited field data exists on key questions surrounding the effectiveness of various prevention and mitigation</p> |

Current Indoor airPLUS Policy Record

Last Revised: November 18, 2013

| ID | Log Date | Classification | Topic |
|----|----------|----------------|---|
| | | | <p>strategies under diverse design, ventilation, climate, weather and occupant behavior and use conditions and patterns.^{1, 2}</p> <p>One of the largest and most recent studies³ by the Canada Mortgage and Housing Corporation (CMHC) of 67 existing homes in Canada confirmed the importance of keeping mechanical equipment and duct work out of attached garages and effectively sealing the garage-to-house interface. The CMHC study also examined three intervention strategies in a small subset of homes, including air sealing the garage-to-house interface, installation of transfer grilles in the garage, and installation of a garage exhaust fan. The study found that all three strategies reduced the peak concentrations of contaminants in both the garages and the houses where they were tested but that transfer grilles alone did not sufficiently reduce indoor pollutant levels. For new homes, the study concluded that air sealing the garage-to-house interface was the preferred method to avoid pollutant entry into the home.</p> <p>It is not yet clear, in the absence of additional field tests under varying conditions, whether and under what circumstances a garage fan adds needed additional protection to the current requirements (i.e., no HVAC equipment in the garage; rigorous attention to air sealing the garage-to-house interface as required by ENERGY STAR, and weather-stripped, automatically closing entry doors from the garage to the house).</p> <p>Recent as-yet-unpublished testing sponsored by DOE in a single home suggests that air sealing is effective at preventing significant infiltration into the living space from the garage under supply-only and balanced-ventilation scenarios. Upcoming research sponsored by ASHRAE should also help to address these data needs. In the meantime, EPA believes that revising the current garage fan requirement will result in more widespread adoption of the full suite of indoor air quality protections offered by Indoor airPLUS—with commensurate public health benefit—without significantly lowering the health protections offered by the multi-faceted Indoor airPLUS strategy for controlling garage pollutants.</p> <p>Therefore, EPA will revise Section 5.4 such that homes with a supply-only or balanced whole-house ventilation system, designed to maintain the living space under a positive or neutral pressure relative to the garage, will not be required to install a garage exhaust fan or perform a garage-to-house pressure differential test.</p> <p>Homes that utilize an exhaust-only ventilation strategy to meet the mechanical whole-house ventilation requirements of ENERGY STAR and Indoor airPLUS raise additional concerns because homes with these systems will typically operate under negative pressure with respect to the garage, drawing makeup air from any unsealed openings or penetrations. EPA recognizes that exposure risks may be higher in homes that use exhaust-only ventilation systems and has concluded that a test to evaluate garage-to-house air leakage in these homes will provide added assurance of effective air sealing of the garage-to-house interface.</p> <p>Therefore, homes with an exhaust-only ventilation system will not be required to install a garage exhaust fan if</p> |

¹ Emmerich, S.J., Gorfain, J.E., & Howard-Reed, C. (2004). Air and Pollutant Transport from Attached Garages to Residential Living Spaces – Literature Review and Field Tests. International Journal of Ventilation, Vol 2 No 3, 265-276. Available: <http://fire.nist.gov/bfrlpubs/build03/PDF/b03067.pdf>

² Murphy, J.D., Beebe, J., Kennedy, D. (1999). Building Code Amendment Justification Research: Poor Indoor Air Quality Mitigation Relative to Attached Garages On Single Family Residences. Journal of Construction Education, Vol 3, No 2, 215-221. Available: http://www.dec.state.ak.us/air/anpms/doc-anpms/Poor_AQ-attach_garage-ASC33.pdf

³ Canada Mortgage and Housing Corporation. (2004, revised 2010). Garage Performance Testing. Research Highlights. Technical Series 04-108. Available: <http://www.cmhc-schl.gc.ca/odpub/pdf/63542.pdf>

Current Indoor airPLUS Policy Record

Last Revised: November 18, 2013

| ID | Log Date | Classification | Topic |
|----|----------|----------------|--|
| | | | <p>a certified Home Energy Rater can:</p> <ul style="list-style-type: none">Verify that the garage-to-house air barrier can maintain a pressure difference of greater than 45 Pascals while the home maintains a 50 Pascal pressure difference with respect to the outdoors. All operable garage openings shall be closed during this test. <p>As an alternative, or in the event that a home with an exhaust-only ventilation system is unable to be verified as meeting the garage-to-house 45 Pascal pressure difference, install either a 70 cfm through-the-wall or ducted fan wired for continuous operation (recommended option) or, alternatively, wired to a motion sensor or other control that will ensure that the fan runs during, and for at least one hour after, occupancy. While Revision 1 lowered the time a fan must run from 1 hour to 10 minutes, this revision re-institutes a minimum 1 hour period of operation. This longer run-time following occupancy is appropriate in cases where the house is under negative pressure relative to the garage to reduce the potential for infiltration of contaminants into the living space.</p> <p>A second concern addressed by the original garage fan requirement is the potential exposure of people to garage contaminants during periods of extended use of the garage for hobbies, recreation, work or other purposes. EPA is not aware of any data regarding such uses and potential associated exposures and recognizes that individual lifestyle choices are the major determinant of the frequency and duration of residential garage usage for these kinds of activities. EPA has concluded that these potential exposures are best addressed through occupant education. EPA will add an advisory that occupants be provided, as part of the Buyer Information Kit (Section 7.3), educational materials on the importance and methods for ventilating the garage during extended periods of continuous use.</p> <p>EPA believes this approach, in concert with the other four strategies for controlling garage pollutants described above, provide appropriate protections according to the most current research on garage pollutants. EPA recognizes that arguments can also be made for retaining, or even increasing, garage ventilation requirements. EPA will continue to monitor and evaluate new data as they become available and will consider future modifications to the garage ventilation requirements, as appropriate.</p> <p>To reflect this change, Indoor airPLUS Construction Specification for Attached Garages Section 5.4 will be revised as follows:</p> <p>5.4 Attached Garages</p> <p><i>NOTE: Completion of the ENERGY STAR checklists now satisfies the following Indoor airPLUS requirement:</i></p> <ul style="list-style-type: none"><i>Isolate attached garages from conditioned spaces as follows:</i><ul style="list-style-type: none"><i>Air-seal common walls and ceilings between attached garages and living spaces before installing insulation (Thermal Enclosure System Rater Checklist (TES) 3 and 5).</i><i>Use weather stripping or equivalent gasket to ensure all doors between living spaces and attached garages are substantially air-tight (TES 5.3.1).</i> <p>Additional Indoor airPLUS Requirements:</p> <ul style="list-style-type: none">Install an automatic door closer on all connecting doors between living spaces and attached garages. |

Current Indoor airPLUS Policy Record

Last Revised: November 18, 2013

| ID | Log Date | Classification | Topic |
|------|------------|----------------|--|
| | | | <ul style="list-style-type: none">• In homes with exhaust-only whole house ventilation meet one of the following two requirements:<ul style="list-style-type: none">○ Equip the attached garage with an exhaust fan with a minimum installed capacity of 70 CFM that is vented directly outdoors. The fan shall be wired for continuous operation or with automatic fan controls (e.g., a motion detector) that activate the fan whenever the garage is occupied and operate for at least 1 hour after the garage has been vacated. If a ducted fan (not through-the-wall) is used, test and verify minimum capacity of 70 cfm.OR○ Verify that the garage-to-house air barrier can maintain a pressure difference of greater than 45 Pascals while the home maintains a 50 Pascal pressure difference with respect to the outdoors. All operable garage openings shall be closed during this test. <p>Advisories:</p> <ol style="list-style-type: none">1. EPA recommends installing a garage exhaust fan if the homebuyer is expected to occupy the garage for work or recreational activities over extended periods of time.2. ENERGY STAR certified fans are highly recommended.3. Provide occupants with information in the Buyer Information Kit (see Section 7.3) on the importance of and methods for ensuring adequate ventilation in the garage while occupied for extended periods of time. |
| 0002 | 07/25/2013 | Change | <p>Section 1.2 - Aggregate or sand drainage layer</p> <p>Issue: Partners have questioned whether the requirement of an aggregate or sand drainage layer under slabs improves moisture control sufficiently to warrant the increased cost. The question was specifically raised for homes built in areas with free draining soils.</p> <p>Resolution: Indoor airPLUS requires a drainage plane beneath slabs in order to prevent liquid water, moisture and, in EPA Radon Zone 1, soil gas infiltration into the home. Rough aggregate is the preferred method to achieve this intent, as it eliminates the ability of water to wick towards the slab. However, since aggregate is not readily available in all areas, the option to use sand has been provided.</p> <p>EPA recognizes that there are situations in which wicking of moisture through the slab is of minimal concern, such as in dry climates, and has previously provided an exemption from this sub-slab drainage layer for dry climates as defined by 2009 IECC Figure 301.1, not including EPA Radon Zone 1 areas. EPA recognizes that homes in areas with free-draining soils and slab-on-grade foundations are also situations in which water accumulation under the slab is a less significant concern. As such, additional exceptions for homes in non-Radon Zone 1 areas with free-draining soils and slab-on-grade foundations will be added to the Indoor airPLUS Construction Specifications. Section 1.2 will be revised as follows:</p> <ul style="list-style-type: none">• Under the polyethylene sheeting or extruded polystyrene (XPS) insulation installed to meet ENERGY STAR Water Management System Builder Checklist Item 1.3:<ul style="list-style-type: none">○ Install a 4 in. layer of 1/2 in. diameter or greater clean aggregate; OR |

Current Indoor airPLUS Policy Record

Last Revised: November 18, 2013

| ID | Log Date | Classification | Topic |
|------|------------|----------------|--|
| | | | <ul style="list-style-type: none">○ Install a 4 in. uniform layer of sand, overlain with either a layer of geotextile drainage matting throughout or strips of geotextile drainage matting along the perimeter installed according to the manufacturer's instructions.○ Exceptions (Not applicable in EPA Radon Zone 1):<ul style="list-style-type: none">▪ Dry climates, as defined by 2009 IECC Figure 301.1.▪ Areas with free-draining soils – identified as Group 1 (Table R405.1, 2009 IRC) by a certified hydrologist, soil scientist or engineer through a site visit.▪ Slab-on-grade foundations. |
| 0003 | 07/25/2013 | Clarification | <p>Separate verification checklist for each unit in multifamily buildings</p> <p>Issue: Partners have inquired as to whether a separate Verification Checklist needs to be completed for each unit in multifamily buildings, or if a single checklist can include more than one unit if an approved sampling method is used.</p> <p>Resolution: Indoor airPLUS requires the same field verification requirements for multifamily units as it does for single-family homes. These requirements include field inspection and testing of each individual unit for builder-verified checklist items, and the option to use the RESNET Sampling Protocol for Rater-verified items only*. As with single-family homes, all units batched into a RESNET Sample set must still have an address-specific certificate attached to the home or unit. In the case of Indoor airPLUS, the certificate, label and Indoor airPLUS Verification Checklist (see Specification 7.3) or comparable information must be provided to each owner. Thus, a separate checklist must be filled out for each unit address.</p> <p>*Raters who operate under a Sampling Provider are permitted to use the RESNET-approved sampling protocol for homes located outside California, and the CEC-approved sampling protocol for homes located in CA, to verify the Minimum Rated Features of the home. Raters who do not operate under a Sampling Provider must verify these requirements in each certified home.</p> |
| 0004 | 07/25/2013 | Clarification | <p>ENERGY STAR Multi-family High Rise Program buildings not eligible for Indoor airPLUS</p> <p>Issue: Partners have inquired whether multifamily units in buildings that are certified through the ENERGY STAR Multifamily High Rise Program are eligible for Indoor airPLUS.</p> <p>Resolution: Multifamily units in buildings that are certified through the ENERGY STAR Multifamily High Rise Program are ineligible for Indoor airPLUS certification at this time. Because the Indoor airPLUS Program works in concert with the ENERGY STAR Certified Homes Program (low rise), only multifamily units that are eligible to participate in the Certified Homes Program are eligible for Indoor airPLUS Certification. In general, this includes all buildings with 1-3 stories and some buildings with 4-5 stories (depending on heating and cooling systems and percentage of residential space). For more information about the ENERGY STAR eligibility requirements for multifamily buildings, please see the Multifamily Decision Tree. http://www.energystar.gov/ia/partners/bldrs_lenders_raters/downloads/mfhr/MFHR_Flowchart_Version_1.0.pdf?4b4b-7ba8</p> |

Current Indoor airPLUS Policy Record

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| ID | Log Date | Classification | Topic |
|------|------------|----------------|--|
| 0005 | 07/25/2013 | Clarification | <p>Section 1.2 - Allowance for XPS Insulation under slab in conjunction with polyethylene sheeting</p> <p>Issue: The Note following Section 1.2 (Capillary Break Installation), which applies to slab-on-grade construction in EPA Radon Zone 1, includes a bullet stating “Do not use extruded polystyrene (XPS) insulation beneath concrete slabs, including basement floors.” Partners have requested clarification of the reasoning behind this prohibition, given the significant insulation benefits from using XPS under the slab.</p> <p>Resolution: In EPA Radon Zone 1, EPA requires the installation of a 6 mil polyethylene vapor barrier to prevent entry of radon gas into the home through cracks or other penetrations of the slab. The bullet precluding use of XPS insulation was meant to indicate that XPS could not be used <i>in lieu</i> of polyethylene sheeting under the slab because XPS does not serve as an adequate vapor barrier to protect against radon infiltration. However, EPA does not intend to preclude the use of XPS under the slab <i>in addition</i> to the 6 mil polyethylene sheeting. Since polyethylene sheeting is specifically required in EPA Radon Zone 1, the bullet precluding the use of XPS insulation creates unnecessary confusion and will be removed from the Indoor airPLUS Construction Specifications. Builders may use XPS under slabs in EPA Radon Zone 1, provided it is used in addition to the required 6 mil polyethylene sheeting. The note accompanying Section 1.2 will now read:</p> <p>Note: In EPA Radon Zone 1 (see Specification 2.1):</p> <ul style="list-style-type: none"> • Polyethylene sheeting must be installed and overlapped by 6 to 12 in. at the seams. • ENERGY STAR staking method for crawlspaces with no slab is not allowed. |
| 0006 | 07/25/2013 | Refinement | <p>Verification checklist signature block</p> <p>Issue: The Indoor airPLUS Revision 1 Construction Specifications Verification Checklist provides space for initials from Raters for the pre-drywall inspection and final verification and a space for builder initials for builder-verified items. A full signature block is not currently provided although the instructions require the Builder and Rater to sign the verification checklist.</p> <p>Resolution: EPA will revise the Verification Checklist to include signature lines for builders and Raters to sign the Verification Checklist once it is completed. The Revision 1 Verification Checklist may continue to be used, but builders and Raters should provide a signature in the initials block.</p> |
| 0007 | 07/25/2013 | Clarification | <p>Section 6.3 - Carpeted area requiring CRI Green Label certification</p> <p>Issue: A partner has asked whether a builder can avoid Carpet and Rug Institute (CRI) certification on carpets and adhesives if < 90 percent of the finished floor area is carpeted.</p> |

Current Indoor airPLUS Policy Record

Last Revised: November 18, 2013

| ID | Log Date | Classification | Topic |
|------|------------|--------------------|---|
| | | | <p>Resolution: The current requirement states that carpets and carpet adhesives composing 90 percent or more of the finished surface area covered by such product use only products labeled with, or otherwise documented as meeting, the Carpet and Rug Institute's (CRI) Green Label Plus testing program criteria. The intent of this requirement is to ensure that the vast majority of carpet used on a project is certified low emission while allowing for small applications for which CRI certified products are not available. EPA is refining the language to read as follows:</p> <ul style="list-style-type: none">• At least 90 percent of the surface area covered by carpet and carpet adhesives must use products labeled with, or otherwise documented as meeting, the Carpet and Rug Institute's (CRI) Green Label PLUS testing program criteria. |
| 0008 | 07/25/2013 | Issue Under Review | Section 5.1 - Decorative gas logs |
| | | | <p>Issue: Partners have questioned the technical rationale for excluding all decorative gas logs, as defined in K.1.11 of NFPA 54 (National Fuel Gas Code), from the Indoor airPLUS program because the design features of certain decorative gas log installations may sufficiently protect occupants from the health hazards associated with this type of combustion appliance. Specifically, the use of a fixed or gasketed glass door in conjunction with a direct vent to the exterior of the home has been suggested as an acceptable combination of health risk protections for homes with decorative gas logs.</p> |
| | | | <p>Resolution: Issue Under Review</p> |